

REMARKS/ARGUMENTS

The title of the invention has been changed, consistent with the amended title in the parent application.

The specification has been amended in line with changes made to the specification of the parent application.

The Abstract of the Disclosure has been amended to in line with the Abstract in the parent application.

New claims 22-41 are presented for examination. Claims 1-21 have been cancelled.

Prior Art cited in Parent Application No. 09/735,566

Claims 33 and 34 in parent application 09/735,566 (corresponding to claims 22 and 23 in this application) were rejected as being unpatentable over US Patent 4,861,640 (Gurol) in view of US Patent 5,306,872 (Kordus). Claim 35 (corresponding to claim 34 in this application) was rejected on the same grounds, and further in view of the publication " Permitted Electromigration of Tungsten-Plug Vias in Chain for Test Structure with Short Inter-Plug Distance" (Aoki).

The grounds of rejection of claims 33 and 34 in the Office Action mailed July 29, 2003 in the parent application, included a contention:

"Gurol discloses a method of forming a workpiece (see Figs. 5A-5D) comprising: forming a row of aligned windows (recesses 17) in planar surface of a dielectric layer 13; filling each of the windows with an electromigration-inhibiting material 27 over the dielectric layer 13 and into the windows 17 to provide plugs or a liner; . . ."

The Examiner's contention appears to be based on a premise (stated in the section *Response to Arguments* in the same Office Action):

"The term 'plugs', as claimed, does not distinguish over the reference to Gurol because Gurol clearly teaches that the windows 17 are filled with deposited conductive material 17."

With respect, the Examiner's contention contradicts the plain dictionary meaning of the words

"fill" and "plug" and is therefore traversed. The Merriam_Webster Dictionary (www.m-w.com/cgi-bin) includes the following entries for "fill" and "plug":

Main Entry: 1fill

. . .

transitive senses

1 a : to put into as much as can be held or conveniently contained <fill a cup with water> b : to supply with a full complement <the class is already filled> . . .

Main Entry: 1plug

. . .

1 a : a piece used to fill a hole : STOPPER . . .

Gurol simply does not meet either of these criteria. Gurol teaches that the layers of metal plating 25, 27, 29 and 35 plate the walls of the through holes 14 leaving an aperture through which a "component wire 43" (Fig. 6, col. 7, lines 33-35) can pass. In this respect alone, claims 22 and 23 are differentiated from and not suggested by Gurol who does not disclose or suggest the combination of features recited in claim 22 and in particular does not disclose or suggest at least:

" . . . filling each of the windows with plugs comprising electromigration-inhibiting material to form a row of plugs; . . ."

Nor does Gurol show or suggest the method claimed in claim 22 as particularized by claim 23: "wherein the plugs each comprises a liner of said electromigration-inhibiting material filled with an electrically conductive material".

Kordus contains no teaching or disclosure pertinent to the shortcomings of Gurol. Consequently, claims 22 and 23 are patentable over Gurol in view of Kordus and in condition for allowance. Aoki is not seen to have any pertinence to or suggest any modification of the teachings of Gurol and thus claim 24 is allowable. Claims 25 and 26 further define claim 22 and are also allowable.

Gurol does not disclose or suggest that the "workpiece comprises a semiconductor substrate and the dielectric layer comprises a semiconductor compound" as recited in claim 27 which is allowable together with its dependent claims 28 and 29.

With respect to claim 30, Gurol does not disclose or suggest at least:

" [a] method of forming a conductive line over a semiconductor substrate, the method comprising: forming on the semiconductor substrate, a dielectric layer having a substantially planar surface;" including the combination of steps including "etching a row of windows in the planar surface . . . ; filling each of the windows with plugs . . . to form a row of plugs; etching portions of the dielectric layer to form trenches . . . ; depositing conductive material to fill the trenches, said conductive material having a specific resistivity less than that of said plugs . . . ; and planarizing the row of plugs and conductive segments . . ."

having the characteristics recited in claim 30. Nor are the features added to claim 30 by any of claims 31-33 disclosed or suggested by Gurol.

Regarding claim 34, Gurol does not disclose or suggest at least:

". . . forming a dielectric layer on a substrate; forming a spaced series of recesses in a surface of the dielectric layer, . . . ; filling the recesses with plugs . . . to form a series of plugs; removing portions of the dielectric layer to form trenches . . . ; filling the trenches with conductive material having higher conductivity than that of the electromigration-inhibiting material . . . ; and planarizing the plugs and conductive segments . . .,"

having the characteristics recited in claim 34. Nor does Gurol disclose or suggest the features added to claim 34 by any of the dependent claims 35-39.

Regarding claim 40, Gurol does not disclose or suggest at least:

"A method of forming a conductive line over a semiconductor substrate, the method comprising: forming on the semiconductor substrate, a dielectric layer; etching a series of windows in the dielectric layer . . . ; filling each of the windows with plugs comprising electromigration-inhibiting conductive material to form a series of plugs; removing portions of the dielectric layer to form trenches . . . ; filling the trenches with conductive material . . . to interconnect the series of plugs, said plugs providing electromigration-inhibiting barriers between said electrically conductive segments; and planarizing the row of plugs and conductive segments . . . to form said conductive line"

having the characteristics recited in claim 40. Claim 41 adds features to claim 40 that are not disclosed or suggested by Gurol.

Neither Kordus nor Aoki is seen to include disclosure that would suggest modification of Gurol in a manner that might have lead to the subject matter claimed in any of claims 30-41.

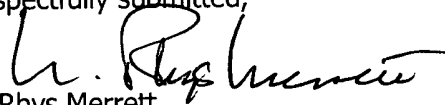
Consequently, all of claims 22-41 are believed to be patentable over the references as discussed above and to be in condition for allowance. Early action to that effect is solicited.

Application No.
(Continuation of Application No. 09/735,566)
Preliminary Am'ndt Dated: October 1, 2003

If there are any questions discussion of which would expedite further prosecution of the application, a telephone call to the undersigned (972-862-7428) would be appreciated.

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Respectfully submitted,

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